Water Quality Monitoring on the Eastern Snake Plain Aquifer – Insights from a Decade of Ground Water Tracer Studies

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Since 2009, the Idaho Department of Water Resources and Idaho Power have cooperated on 25 ground water tracers on the Eastern Snake Plain Aquifer (ESPA). Those tracers ranged from 1100 feet to over 19 miles and have occurred on the western half of the ESPA. The traces used sodium fluorescein injected at or below the water table, or the dye was applied to influent at recharge basins. Monitoring considerations for dye include the construction of proposed monitoring wells, location of monitoring at springs and spring complexes, timing of monitoring at various locations along the flow path, the expected concentration of dye and an understanding of the spatial extent of the dye cloud.

Even minor changes in the spatial and temporal extent of monitoring can miss dye detections at both wells and spring monitoring locations. Monitoring for dye has unique advantages over ambient groundwater monitoring or monitoring for specific constituents. A monitoring program for a dye tracer must be flexible but it allows for the tracking of a known quantity from a specific location. Tracer studies also allow for the cost-effective monitoring of a constituent at low concentrations (0.001 ppb).

Dye tracing can provide information on groundwater velocity, direction of flow and rate of dilution. It can also be used to develop surrogate constituents that maybe used to guide downgradient monitoring locations. Understanding the movement of a dye cloud in an aquifer can provide important insights on the movement of groundwater and aquifer characteristics.

Consideration of the results of tracer studies can aid in spatial and temporal design of a groundwater or spring monitoring program.